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Astro - reports

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July 18, 1956

Subj: Trip Report, Projector Project
Trip to Projector Site 25X1
July 9 through July 11

To:

From:

At the request of our projector office, I made a trip to the Projector Site with to determine the state of affairs in regard to the driftsight and hand control equipment. Sketchy information had reached us that some of this equipment was not operating properly and we were asked to gather first-hand information from the site people. 25X1

On arrival at the site on Monday morning, and I surveyed our installed equipment and discussed with of the maintenance group his recent maintenance procedures on the equipment. According to his records, no major malfunctions had occurred during the week or two previous. Preceding that, only hand control boot changes and the like had been required. 25X1 25X1

Before any further discussions with other people, we located in his office and discussed at some length his feelings about the driftsight and hand control. His major concern with the driftsight and control equipment was apparently based on information from the various operating people. He asked if we could determine whether this information was the result of operator training equipment function or operational difficulties. We pursued the collection of this information over the rest of Monday, Tuesday and early Wednesday. It resulted in some interesting discussions with members of the training group and the operating group B and others. I think in the interests of easier reading, a tabulation of the various points covered would be advisable. Such a tabulation will be made following a listing of the people with whom we discussed the driftsight and hand control equipment: 25X1 25X1 and perhaps a few others.

1. Driftsight tests.

brought up the point of driftsight tests and said that the program described in report of 1-12-56 had never been undertaken. On Tuesday when was present we discussed this test problem at some length. It seems that these tests had not been conducted at all until quite recently; in fact, not until May 7 through 29. Apparent difficulty in running these tests was that the AP had not been operating too well, thus making the installation too unstable to operate the driftsight control properly. Until the group ADSCM tests, the AP was not in satisfactory operating condition, and that without it the operator was just too busy to spend any time at all trying to operate the drift and track knobs. 25X1 25X1 25X1

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Only recently during group B training and testing has some A P time been available. [redacted] stated that because of roll conditions of $\pm 2^{\circ}$ and pitch even under A P conditions of 1°, the drift and track adjustments were not too easy to make. [redacted] felt that this kind of difficulty would disappear as operator confidence increased with more training and operation activity. [redacted] said that the operator's time was limited due to other problems of the operation, and that he could not answer the question of reproducibility due to the short periods of operation that his people had encountered. [redacted] said that he felt that [redacted] group was responsible for the system testing and that his group should conduct these drift tests. [redacted] both said that they would help with the test program to gather data on the driftsight use. [redacted] group will continue also to collect this data. The data will be turned over to Dr. Scott's group for evaluation. 25X1 25X1 25X1 25X1 25X1 25X1

The point that was brought out in this discussion was the fact that the A P conditions up to this time had certainly not allowed sufficient time for driftsight tests. We believe that if the A P conditions are in order and if the operators, use reasonable care and diligence, they will be able to get drift readings that will prove satisfactory for later use with the "C" configuration.

2. Manual Drift Reticle.

Because of the difficulty in setting the drift that the various operators have encountered, [redacted] of the training group devised an alternate scheme of determining the drift. They prepared a lucite grid which they installed over the eye piece of the driftsight. With the line of sight vertically downward they would view objects in the field of view and determine their apparent motion in respect to the drift reticle gird lines. They adjusted this grid until objects track down the line, and they read the drift angle from the scale at the top of the eye piece. They suggested that this drift reading then be put into the drift setting knob of the hand control as the drift reading. 25X1

We certainly have no objection to the use of such a device. In fact, we offered to prepare one back at the factory for use in further tests of this device, [redacted] volunteered to prepare one during the week of July 9 and expected that it might be completed by Friday of that week. 25X1

[redacted] commented on the interaction of the drift and track adjustments, and felt that they were confusing and difficult for the operator to understand. [redacted] pointed out that there is actually no mechanical interaction of these two functions. Because of the design philosophy of the driftsight control and driftsight scanhead, in the interests of simplicity and lightweight, apparent motion of the line of sight does occur because of the drift azimuth input between the scanhead and the hand control axes. 25X1 25X1

We believe that with some practice the operator can perform the necessary iteritive adjustment process and make a satisfactory drift and track adjustment. In thinking about this problem later, [redacted] again considered the perspective problem. Because of the geometry of the situation, only the line of sight is properly tracked and drift correct. The fact that the reticle pattern does not contain a center spot or center break in a cross line maybe responsible for some of the difficulty now being encountered by the operators. Such a cross line was originally planned and suggested to the customer, but was deleted. We later performed some tests in building No. 1 on training unit but with the present reticle pattern the logical thing to do is to pick out an intersection of the line with the side of the box in the center of the reticle or perhaps the corner of the reticle. Anyone of these points will track for a time and then tend to drift off. It is possible that this condition is accounting for some of the operator difficulty. We feel this is important enough so that an immediate change to incorporate such a center cross line is being initiated for inclusion in all possible units. 25X1

3. Prism Edges.

In talking with [redacted] we again became more aware of the prism edge problem and its appearance at the pupil of the eye piece. These are the apparent blurry lines that one sees when looking into the eye piece. No recent comments had been made until now about this point. But Ray mentioned that the sights varied widely in regard to the blurry line and that some were a lot more noticeable than others. He said in some cases they are particularly distracting and tiring to him and some cases obstruct vision. He said in such cases he moves his eye to the right or left side of the pupil and then he notices that the field appears colored; blue to the left, yellow to the right. The color, of course, is due to the fact that one is looking through the edge of the eye piece and this portion of the lens is giving a dispersion effect. This is only because he is not using the center area of the pupil. Later on we considered this problem when looking at the training unit. The pupil of the trainer system was examined with a small pupil size approximately 1 mm in diameter punched in a match cover. When held before one's eye the blurry lines became much more noticeable, particularly in well-illumimated areas of the field. It occurred to us that perhaps [redacted] has very small pupils. This turned out to be true and may possibly be true of others of the operators. Since under high-level light conditions, [redacted] and perhaps other's eyes have a pupil diameter of perhaps only a millimeter or a little more. The magnified edge of the prism may occupy a large line across this pupil diameter thus appearing as an obstruction. 25X1 25X1 25X1

The elimination of this condition we believe to be most imperative and work is now underway to modify the head prisms in 5 units, now at the factory for modification to permit fitting the sextant unit.

The edges will be made sharp enough so that it should be no reoccurrence of this problem on the modified units. Other units will be modified as soon as they become available.

4. Sticky Hand Control.

During our discussion with [redacted] he mentioned that one of the hand controls appeared to be sticky. He didn't remember which installation this was in but in later discussions, and a sheet of paper I got from [redacted] indicated that this unit was in 351 and was the unit noted in [redacted] report of 6/13, 6/27, and 6/29. According to the notes made on this sheet this driftsight unit was checked and boresighted after each operation, but apparently nothing was done about investigating the stickiness. As we arrived on the scene, this hand control unit had been removed from 351 to permit installation of other equipment. It was hand control number 113. We put hand control unit 113 in the training installation. It was noted that it was slightly sticky or jerky in its tracking operation and it was also noticed that the hand control knob did not work quite properly. It has since been requested that this unit be returned to the factory for inspection and repair. It is difficult for us to understand why this unit was allowed to remain in installation 351 over the period from 6/12 to 6/29. This unit should have been replaced with another unit. If none was available in stock, the training unit could have been subsituted as it was considered by all as being a fine-working unit. This type of maintenance problem requires some initiative on the part of the maintenance man to locate difficulties such as this so they can be investigated either in the laboratory of if he feels he is not capable of checking it, he'll return it to the factory. Further problems associated with the maintenance program will be discussed under that heading.

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5. Periscope Drive Cables.

In discussing sticky operating hand controls and the like [redacted] stated that he occasionly had to loosen up the collar which attaches to the periscope body at the periscope end of the operating cables. It is possible by turning this collar on too far to pinch the shaft driven by the cable. This is a minor modification kind of job and it is proposed that new collars be provided that will not jam up and they can be added to the units as they are available to the maintenance people. Modification kits will be provided for this purpose.

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6. Training.

The subject of training was discussed at some length during the meeting with [redacted] and others. During my discussions with various operators, those of group A, B and the training people, it was noticed that some people attending short discussions and demonstrations felt that they knew how the equipment operated, particularly in regard to the drift and track adjustments, and let's say even the positioning knob operation.

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We, of course, understand that this piece of equipment is only one of many other, perhaps more complex, pieces of equipment. However, individual "do it yourself" type training, we believe, is the best way to learn how to operate anything. The training unit in building No. 1 we believe, has proved invaluable for this type of training. It was pointed out that each operator now is schedule for two hours training on this equipment. If this two hours is properly supervised and proper instruction given each operator, this two hours should prove invaluable to him during regular equipment operation.

7. Installation and Maintenance People.

During this recent 2½ days visit to the site and during other visits, it is quite apparent that availability of installations and maintenance work is erratic to say the least. This erratic availability of the installations for maintenance work is made still worse by the schedules of people supposed to do the maintenance work. It has always happened that when equipment was available to be worked on, the maintenance people were not available for maintenance because they were too busy working on tracker cameras, not necessarily in a maintenance function, but in the operations function of loading and unloading. They often were called to work on configurations during these periods. The experience during this trip proved to be no different than on previous visits.

If this type of maintenance schedule is the rule, I don't wonder that the sticky hand control was left in 351 for 17 days or more, before it got removed. Actually it was longer because it was not removed until the new installations started and then it was only because of this; this brings up another point. No maintenance records or feedback has been received at our office to indicate the problems encountered.

The problem of availability of maintenance people for the hand control and driftsight and tracker camera was discussed with [redacted] 25X1 on our return to the LA area on the 11th.

[redacted] 25X1 blamed the problem of the maintenance scheduling on the fact that they were short-handed for all the work they had to do. He said he would try to do something about it but it remains to be seen what can be done.

8. Information Feedback and Communication Delay.

One of the problems, if not the major one, in this program, is keeping our finger on the problems encountered at the site. If [redacted] group 25X1 could supply straight forward and correct information regarding operator comments maintenance problems and any other problems needing our attention, we can certainly do a better job and act on them more promptly then we have been able to do in the past. When our tech rep. becomes cleared and is deployed to the site, it is our hope that he can keep us informed on a regular schedule so that we can keep abreast of the current problems.

Summary:

1. Driftsight tests will be conducted at the test site by [redacted] group and [redacted] group. The data will be forwarded to Dr. Scott for evaluation. 25X1 25X1

2. Prisms. The head prism condition will be corrected to eliminate the distracting blurry lines caused by the blunt edges of the prisms.

3. Reticle Pattern Change. The reticle pattern will be changed to include a cross line at the center to provide line of sight drift and track adjustment.

4. Input Collars. Modified input collars will be provided for all units to eliminate the possible reoccurrance of the shaft binding at the periscope end.

5. Hand control No. 113 will be checked and repaired as required to eliminate the stickiness noticed during operation.

6. The availability of maintenance people should be improved to provide adequate maintenance work on the driftsights and hand controls.

7. Training. It is recommended that all possible training with proper supervision along side the operator so that the drift and track adjustments will become a relatively easy function and it is believed they will be with some practice.

8. A tech rep. will be provided in the near future to supervise the maintenance of this equipment. It is expected that suitable engineering supervision will be provided from the factory to assist this man in his work.

9. A modified eye piece will be provided incorporating the suggested drift reticle for test purposes.

10. Two spare eye piece elements will be provided to replace eye piece elements scratched in installations 342 and 351.

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GFW:jl 7/18/56